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# Impact of subgrid-scale vegetation heterogeneity on the simulation of carbon-cycle characteristics

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## Abstract

The carbon cycle module of the global climate model developed at the Obukhov Institute of Atmospheric Physics, Russian Academy of Sciences (IAP RAS CM) has been extended by implementing the subgrid-scale heterogeneity (SH) of plant functional types (PFTs). It is found that subgrid-scale PFT heterogeneity enhances the photosynthesis intensity and increases vegetation and soil carbon stocks in grass-dominated regions. In forest-dominated regions, photosynthesis is suppressed and vegetation and soil carbon stocks are diminished. Regionally, accounting for subgrid-scale vegetation heterogeneity may lead to twofold changes in these variables. On the whole, accounting for subgrid-scale PFT heterogeneity enhances (suppresses) the carbon flux in regions where it is directed from terrestrial ecosystems to the atmosphere (from the atmosphere to terrestrial ecosystems). © 2014 Pleiades Publishing, Ltd.

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## Keywords

anthropogenic RCP scenarios, carbon cycle, CMIP5, IAP RAS CM, subgrid-scale heterogeneity